



# Pinellas Environmental Restoration Project

## Quarterly Progress Report

### 4.5 Acre Site

### April Through June 2005

July 2005



## Office of Legacy Management

**Pinellas Environmental Restoration Project  
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4.5 Acre Site**

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Work Performed by S.M. Stoller Corporation under DOE Contract No. DE-AC01-02GJ79491  
for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado

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## **Acronyms and Abbreviations**

bls	below land surface
COPC	contaminants of potential concern
DCE	dichloroethene
DOE	U.S. Department of Energy
DPE	dual-phase extraction
FDEP	Florida Department of Environmental Protection
ft	feet
IRA	Interim Remedial Action
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
mg/L	milligrams per liter
mV	millivolts
NGVD	national geodetic vertical datum
NTU	Nephelometric Turbidity Units
RPD	relative percent difference
STAR Center	Young - Rainey Science, Technology, and Research Center
TCE	trichloroethene
TCOPC	total contaminants of potential concern
VC	vinyl chloride
VOCs	volatile organic compounds

## 1.0 Introduction

The *Pinellas Environmental Restoration Project Quarterly Progress Report for the 4.5 Acre Site* describes environmental restoration activities for the Pinellas 4.5 Acre Site located in Pinellas County, Largo, Florida. The former U.S. Department of Energy (DOE) Pinellas Plant facility consisted of the 4.5 Acre Site and the Young - Rainey Science, Technology, and Research Center (STAR Center) ([Figure 1](#)). The facility was constructed in the mid-1950s as part of a nationwide nuclear weapons research, development, and production complex. Production of weapons-related components ceased in September 1994. However, as a result of these operations, contamination exists in the surficial ground water beneath the Site.

Administration of DOE activities at the 4.5 Acre Site is the responsibility of the DOE Office of Legacy Management in Grand Junction, Colorado. S.M. Stoller Corporation (Stoller), a prime contractor to DOE's Office of Legacy Management in Grand Junction, provides technical support to DOE for remediation and closure of all active solid-waste management units on site and for the 4.5 Acre Site.

The 4.5 Acre Site is located to the northwest of the STAR Center, northeast quarter of Section 13, Township 30 South, Range 15 East ([Figure 2](#)). This parcel was owned by DOE from 1957 to 1972, at which time it was sold to a private landowner. During the period of DOE ownership, the property was used for disposal of drums of waste resins and solvents. As a result of this practice, the surficial aquifer was impacted by volatile organic compounds (VOCs), primarily vinyl chloride (VC), toluene, trichloroethene (TCE), and 1,2-dichloroethene (DCE). DOE completed a source removal in 1985.

An Interim Remedial Action (IRA) consisting of ground water extraction and treatment via air stripping, and a routine ground water monitoring program were initiated in May 1990. In July 1997, a modification of the IRA involving installation of dual-phase extraction (DPE) wells provided a more aggressive system to remove ground water contamination. In November 1999, the DPE/air-stripping system was replaced with an in-situ biosparging treatment system.

Currently, ground water cleanup is proceeding according to provisions in the document *Remediation Agreement for the Four and One-Half Acre Site in Largo, Pinellas County, Florida* (Remediation Agreement) (FDEP 2001), an agreement between DOE and the Florida Department of Environmental Protection (FDEP); and in accordance with applicable portions of "Corrective Actions for Contamination Site Cases," an appendix to FDEP's *Enforcement Manual* (FDEP 1999).

The *4.5 Acre Site Biosparging System Integration Plan* (DOE 2000) was approved by FDEP on January 17, 2001. This plan states that performance monitoring would be undertaken on a quarterly basis. Therefore, in April 2001, performance monitoring of the remedial system through the use of direct push technology was undertaken. However, the biosparging systems were shut off in May 2003 with no plans to restart them and no performance monitoring data have been collected since April 2003. Subsequent monitoring has been adapted to fit the new remediation scenario and performance monitoring as defined in the *Interim Remedial Action Plan for Ground Water Recovery at the 4.5 Acre Site* (DOE 2003).

The IRA Plan for Ground Water Recovery at the 4.5 Acre Site was submitted to FDEP on August 29, 2003, and approved by FDEP on September 19, 2003. Implementation of the IRA Plan commenced on March 8, 2004, when construction activities began on the IRA treatment system. The treatment system consists of an extraction well field (three recovery wells), pumps and associated piping, transmission water pipeline, utility connection, a low profile tray air stripper unit, and effluent piping. The new IRA system began operations on April 26, 2004.

The new IRA system is a temporary measure that was outlined in the *Remedial Action Plan for the Pinellas 4.5 Acre Site* (DOE 2001) as a contingency option in the event that biosparging resulted in extending the contaminant plume.. Currently, the *Pinellas Environmental Restoration Project 4.5 Acre Site Remedial Action Plan Addendum* is being prepared. This document presents a proposed final action for the 4.5 Acre Site that involves closure of the site using the provisions of the recently adopted State of Florida Global Risk Based Corrective Action regulations. This addendum will be submitted to FDEP by April 14, 2005.

This document is the quarterly progress report for the 4.5 Acre Site for April through June 2005, as requested by FDEP. The results of monitoring activities and a summary of ongoing and projected work are provided in this report.

## 1.1 Quarterly Site Activities

Obtained water-level measurements from all monitoring wells on April 5, 2005.

Conducted the annual sampling event (i.e., collected ground water samples from 41 monitoring wells and three recovery wells) in April 2005. All wells were sampled for VOCs and analyzed using U.S. Environmental Protection Agency (EPA) SW-846 Method 8260. Six wells were sampled for arsenic and analyzed using EPA SW-846 Method 6010.

Reported the results of annual sampling events (this document).

## 2.0 Monitoring Data

### 2.1 Ground Water Elevations and Flow

Within an 8-hour period on April 5, 2005, depth-to-water measurements were taken in all monitoring wells at the 4.5 Acre Site as part of the sitewide quarterly sampling event. The depth to water in each well was measured with an electronic water-level indicator. The April ground water elevation data for the 4.5 Acre Site are listed in [Table 1](#). The data and information from deep wells were used to construct contours of water levels in the deep surficial aquifer in [Figure 3](#).

The interpretative contours on Figure 3 show ground water flow generally to the west-northwest. These flow patterns are consistent with those observed at the site during the previous 2 years following shutdown of the biosparging system in May 2003. In addition, capture zones are apparent around the three recovery wells (RW01, RW02, and RW03) at the 4.5 Acre Site. These capture zones indicate that the ground water recovery system at the site is maintaining hydraulic control along the west fence line.

The water table ranged from about 3 to 9.5 feet below land surface (ft bls), with ground water elevations that ranged from a high of 15.35 ft at PIN20-TE01 to a low of 8.99 ft at PIN20-M055. The hydraulic gradient across the site was approximately 0.011 feet per foot. This gradient is similar to that observed the previous 2 years. Using Darcy's Law, along with approximations of 1 ft/day for hydraulic conductivity and 0.3 for effective porosity, ground water at the site is estimated to move about 13 ft/year. This velocity is slightly greater than previously observed velocities of 3 to 10 ft/year.

## 2.2 Ground Water Sampling

Forty-four monitoring and recovery wells were sampled by Stoller personnel in April 2005. All wells were sampled for VOCs and six wells were sampled for arsenic.

All samples were collected in accordance with the *Pinellas Environmental Restoration Project Sampling Procedures for the Young - Rainey STAR Center and 4.5 Acre Site* (DOE 2004) using FDEP procedures. All samples collected were submitted to Accutest Laboratory for analysis. Accutest is accredited by the Florida Department of Health in accordance with the National Environmental Laboratory Accreditation Conference, certification number E83510. VOCs were analyzed using EPA SW-846 Method 8260 and arsenic was analyzed using EPA Method 6010.

All of the monitoring wells were micropurged with dedicated bladder pumps and samples were collected when the field measurements stabilized. Extraction wells were sampled using their associated flowlines with dedicated sampling ports. [Table 2](#) lists measurements of pH, specific conductance, dissolved oxygen, oxidation/reduction potential, turbidity, and temperature recorded at the time each sample was collected. These measurements were collected using a flow cell and multiparameter meter.

## 2.3 Ground Water Analytical Results

Individual contaminants of potential concern (COPC) and total COPCs (TCOPCs) concentrations in samples collected from wells at the 4.5 Acre Site are included in [Table 3](#). Arsenic data are shown on [Table 4](#). The previous four quarters of results are included in Table 3 for comparison. [Figure 4](#) shows the TCOPCs concentrations for October 2004.

No COPCs were detected in samples from the 20 sample locations listed below (results listed in Table 3).

PIN20-M003	PIN20-M012	PIN20-M025	PIN20-M055	PIN20-M40S
PIN20-M005	PIN20-M015	PIN20-M028	PIN20-M22D	PIN20-M41D
PIN20-M007	PIN20-M023	PIN20-M036	PIN20-M38D	PIN20-MWL5
PIN20-M011	PIN20-M024	PIN20-M054	PIN20-M40D	PIN20-MWL6

Samples from 24 sample locations listed below contained COPCs at detectable levels (results listed in Table 3).

PIN20–0502	PIN20–M049	PIN20–M059	PIN20–M064	PIN20–MWL4
PIN20–0503	PIN20–M053	PIN20–M060	PIN20–M18D	PIN20–RW01
PIN20–M001	PIN20–M056	PIN20–M061	PIN20–MWL1	PIN20–RW02
PIN20–M019	PIN20–M057	PIN20–M062	PIN20–MWL2	PIN20–RW03
PIN20–M035	PIN20–M058	PIN20–M063	PIN20–MWL3	

The maximum TCOPCs value detected was 12,725 micrograms per liter ( $\mu\text{g/L}$ ) at PIN20–M063. The compound detected at the highest concentration in PIN20–M063 was cis-1,2-DCE at a concentration of 7,230  $\mu\text{g/L}$ . Reported “J” values are not considered in the TCOPC analyte concentrations. The only arsenic detection was in PIN20–0503 at a concentration of 0.0131 milligrams per liter (mg/L).

Laboratory reports for quarterly samples collected in April 2005 are provided in [Appendix A](#). IRA treatment system influent, effluent, and recovery well analytical results are provided in [Appendix B](#).

## 2.4 Quality Assurance/Quality Control

Four duplicate samples were compared to their paired sample and the relative percent differences (RPDs) between the results were calculated. Results of analyses for each duplicate sample are listed in [Table 5](#). From the four duplicate samples, 147 individual compounds were analyzed. All sample duplicate pairs meet the quality control criteria for RPD. All data are considered Class A level, indicating that the data may be appropriately used for quantitative and qualitative purposes.

According to the Stoller Sampling Procedures, duplicate samples should be collected at a frequency of one duplicate for every 20 or less samples. There were 44 VOC samples and four duplicate samples. There were six arsenic samples and one duplicate sample. The duplicate criterion was met.

During the prior sampling event in January 2005, four trip blanks showed positive results for 1,1-DCE ranging from 2.4 to 2.8  $\mu\text{g/L}$ . Stoller investigated the problem but no specific cause for the results could be determined by the laboratory or by the Stoller sampling team. In order to evaluate whether the problem was due to field or laboratory practices, Accutest prepared holding blanks for the April 2005 event. The holding blanks were prepared after receipt of the samples by the laboratory and were analyzed with the samples. None of the seven holding blanks or 22 trip blanks from the April 2005 event showed any contamination. Therefore, it appears that 1,1-DCE contamination only occurred during the January 2005 event and did not recur.

No significant deficiencies were found during validation of the field data collected during the quarterly sampling event. A software module for identifying and tracking anomalous ground water data points within the SEEPro database was used to report which of the COPC values lie outside of historical minimum and maximums for that location. No anomalous concentrations were found in the results from this sampling event. No anomalous results are being tracked from previous events.

## 3.0 Treatment System and Recovery Well Operations

From April 1 through June 30, 2005, the treatment system processed 608,190 gallons of ground water. [Figures 5, 6, and 7](#) present the monthly volume of ground water recovered during April through June 2005 from the 4.5 Acre Site recovery wells.

The treatment system experienced some outages during this quarter due to heavy rainfall. In April, a shutdown was experienced over the weekend of the 9th and 10th due to a failed tank float. Both of the floats in the tank were replaced on April 11th. In May, a shutdown was experienced on the weekend of the 21st and 22nd due to heavy rainfall filling the surge tank and tripping the alarm. In June, there were no shutdowns.

A summary of analytical results for samples collected at the 4.5 Acre Site treatment system during this quarter is provided in [Table 6](#). Treatment system influent and effluent samples were analyzed for VOCs and the effluent discharge volume was recorded to comply with the Pinellas County wastewater permit. In the effluent samples, all volatile organic aromatic concentrations were under the Pinellas County regulatory limit of 50 µg/L.

[Table 7](#) presents the average monthly concentration and the calculated mass of selected analytes processed by the 4.5 Acre Site treatment system for each month of this quarter. These monthly results are based on the measured system influent concentration and ground water flow.

FeRemede® is being utilized at the new 4.5 Acre Site treatment system to control the deposition of iron and hardness salts in the air stripper. Additionally, sodium hypochlorite is also being utilized as a microbiocide to control biological growth in the air stripper.

## 4.0 Data Interpretation

This data interpretation section is added to the April to June quarterly report each year to aid in evaluating remediation progress. This section consists of plots showing contaminant concentrations trends (Section 4.1), plume maps (Section 4.2), and a discussion of site geochemistry (Section 4.3).

### 4.1 Contaminant Concentration Trends

The entire data set was evaluated and selected wells and COPCs were chosen for presentation as time versus concentration plots to evaluate remediation progress and potential plume movement.

[Figure 8](#) shows the cis-1,2-DCE and VC concentration trends in well PIN20-0502. Concentrations of these two COPCs in this well began increasing during the April 2002 sampling event, likely as a result of subsurface pressurization that occurred during stopping and starting of the biosparging system. The biosparging system was permanently shut down in May 2003. Subsequently, the cis-1,2-DCE concentration in well 0502 stabilized or began to decrease slightly, while VC concentrations continued to increase. The continued increase in VC concentration likely is due to naturally occurring biodegradation of cis-1,2-DCE. Additional evidence of biodegradation is the presence of significant concentrations of ethane and ethene ([Table 8](#)), both of which are VC degradation products.

[Figure 9](#) shows increasing trends for TCE, cis- and trans-1,2-DCE, and VC in well M001, located approximately 135 ft south of well 0502. These increasing trends are also likely due to the operation of the biosparging system. These trends likely will stabilize and start to decrease over time due to naturally occurring biodegradation processes. Significant concentrations of ethane and ethene are also present in this well (Table 8), indicating that complete biodegradation is occurring.

[Figure 10](#) shows TCE, cis-1,2-DCE, and VC concentration trends in well PIN20–MWL4. Clearly the concentrations of these three contaminants have decreased significantly over the last few years. The slight increase in cis-1,2-DCE concentration in 2004 likely is due to TCE biodegradation. The biosparging system was shut down in May 2003, but concentrations have continued to decrease, indicating that the biosparging probably was not the cause of the concentration decreases. Based on the associated geochemical data from these wells, as discussed in Section 4.3, it appears likely that naturally occurring reductive dechlorination is the cause of these concentration decreases. A significant concentration of ethene was observed in April 2005 in this well (Table 8).

## 4.2 Plume Maps

Plume maps were generated for TCOPCs (Figure 4) and the individual site COPCs: VC ([Figure 11](#)), cis-1,2-DCE ([Figure 12](#)), TCE ([Figure 13](#)), and benzene ([Figure 14](#)). The inferred plume boundaries for the individual compounds are the respective maximum contaminant levels (MCLs) of the compounds. Concentrations that are below the MCL are not included in the individual compound plumes. The TCOPCs map is a summary of the individual compound maps. The plume maps also show the plume boundary from last year to show any changes over the last year.

The VC plume ([Figure 11](#)) is slightly smaller than the 2004 plume, based on the lack of VC in wells M055 and M015. The cis-1,2-DCE plume ([Figure 12](#)) is slightly larger than the 2004 plume due mainly to the detection cis-1,2-DCE in well M062; this well had not yet been installed when the 2004 plume map was made. The TCE plume for 2005 ([Figure 13](#)) is similar in size to the 2004 plume. The benzene plume ([Figure 14](#)) is smaller for 2005 relative to 2004, with benzene detected only in well MWL1. The benzene plume was extended into the center of the site in 2004 based on data collected in 2003 using direct push sampling. The 2003 data are 2 years old and all benzene concentrations were very low at that time, near the MCL, so it is unclear whether or not benzene concentrations still exceed the MCL in the center of the site.

In summary, the total plume area at the 4.5 Acre Site is slightly smaller than in 2004, due mainly to lack of VC detections in wells M055 and M015. These decreases in VC concentrations are likely due to both the effect of the recovery wells at removing contaminated ground water and continuing natural biodegradation of the contaminants.

## **4.3 Geochemical Parameters**

Geochemical parameters measured in the field in all wells at the 4.5 Acre Site during April 2005 are summarized in Table 2. Conditions across the site generally are reducing as evidenced by the low values of dissolved oxygen and oxygen/reduction potential.

## **5.0 Tasks to be Performed Next Quarter**

The following tasks are scheduled during the next quarter (July through September 2005).

Quarterly sampling and analysis of ground water and water level measurements in July.

Continue monitoring of the IRA treatment system for short-term ground water recovery action and monthly sampling and analysis of ground water will continue in order to provide compliance and system operations data.

Address comments from FDEP on the *Pinellas Environmental Restoration Project Remedial Action Plan Addendum*.

## **6.0 References**

Florida Department of Environmental Protection (FDEP), 1999. "Corrective Actions for Contamination Site Cases," Appendix to FDEP *Enforcement Manual*, May.

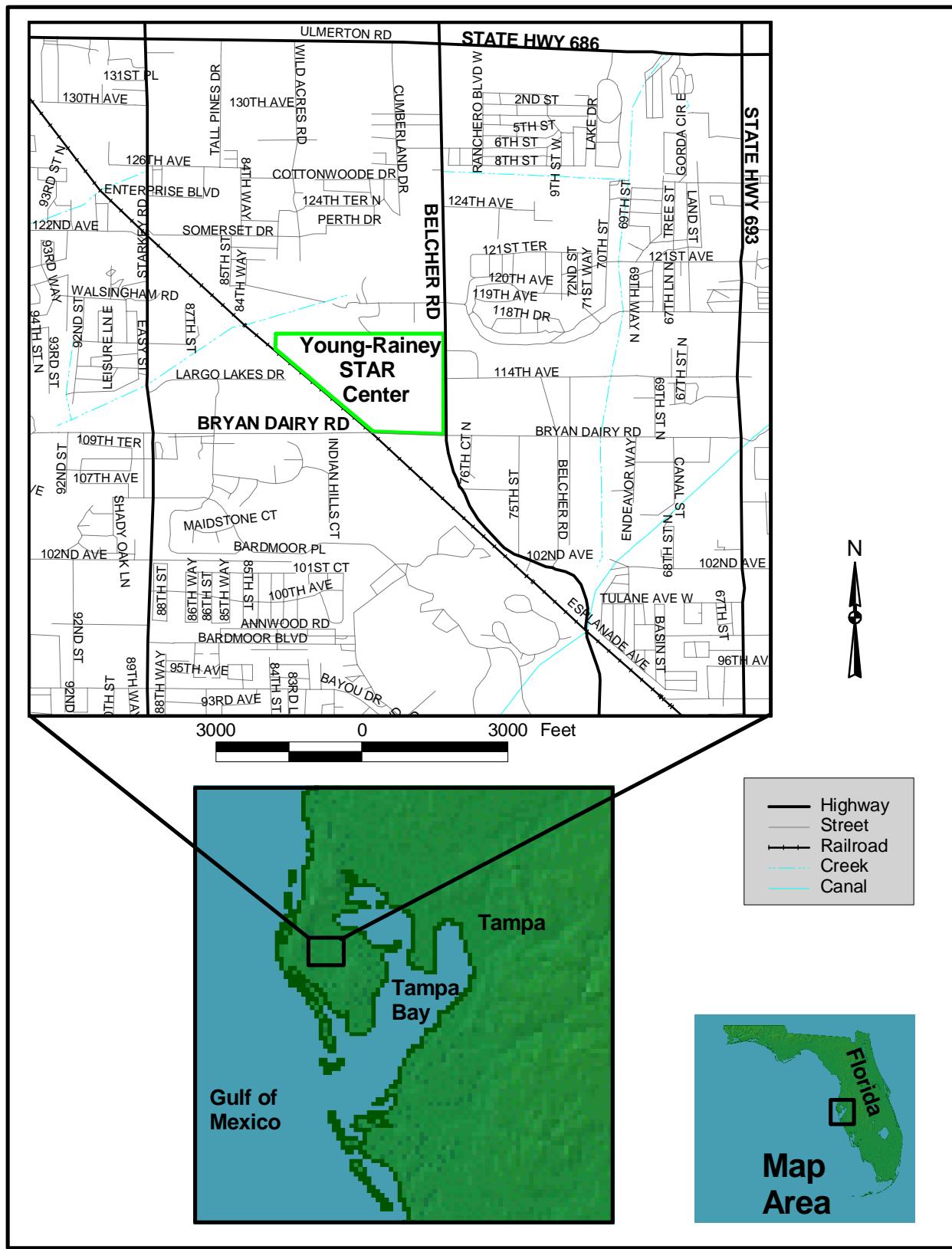
Florida Department of Environmental Protection (FDEP), 2001. *Remediation Agreement for the Four and One-Half Acre Site in Largo, Pinellas County, Florida*, U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, January.

DOE (U.S. Department of Energy), 2000. *4.5 Acre Site Biosparge System Integration Plan*, GJO-2000-182-TAR, MAC-PIN 25.5.1.1, prepared by U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, December.

DOE (U.S. Department of Energy), 2001. *Remedial Action Plan for the Pinellas 4.5 Acre Site*, U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, July.

DOE (U.S. Department of Energy), 2003. *Pinellas Environmental Restoration Project Interim Remedial Action Plan for Ground Water Recovery at the 4.5 Acre Site*, GJO-2003-480-TAC, prepared by U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, August.

DOE (U.S. Department of Energy), 2004. *Pinellas Environmental Restoration Project Sampling Procedures for the Young - Rainey STAR Center and 4.5 Acre Site*, DOE-LM/GJ718-2004, prepared by U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado, September.



*Figure 1. Young - Rainey STAR Center Location*

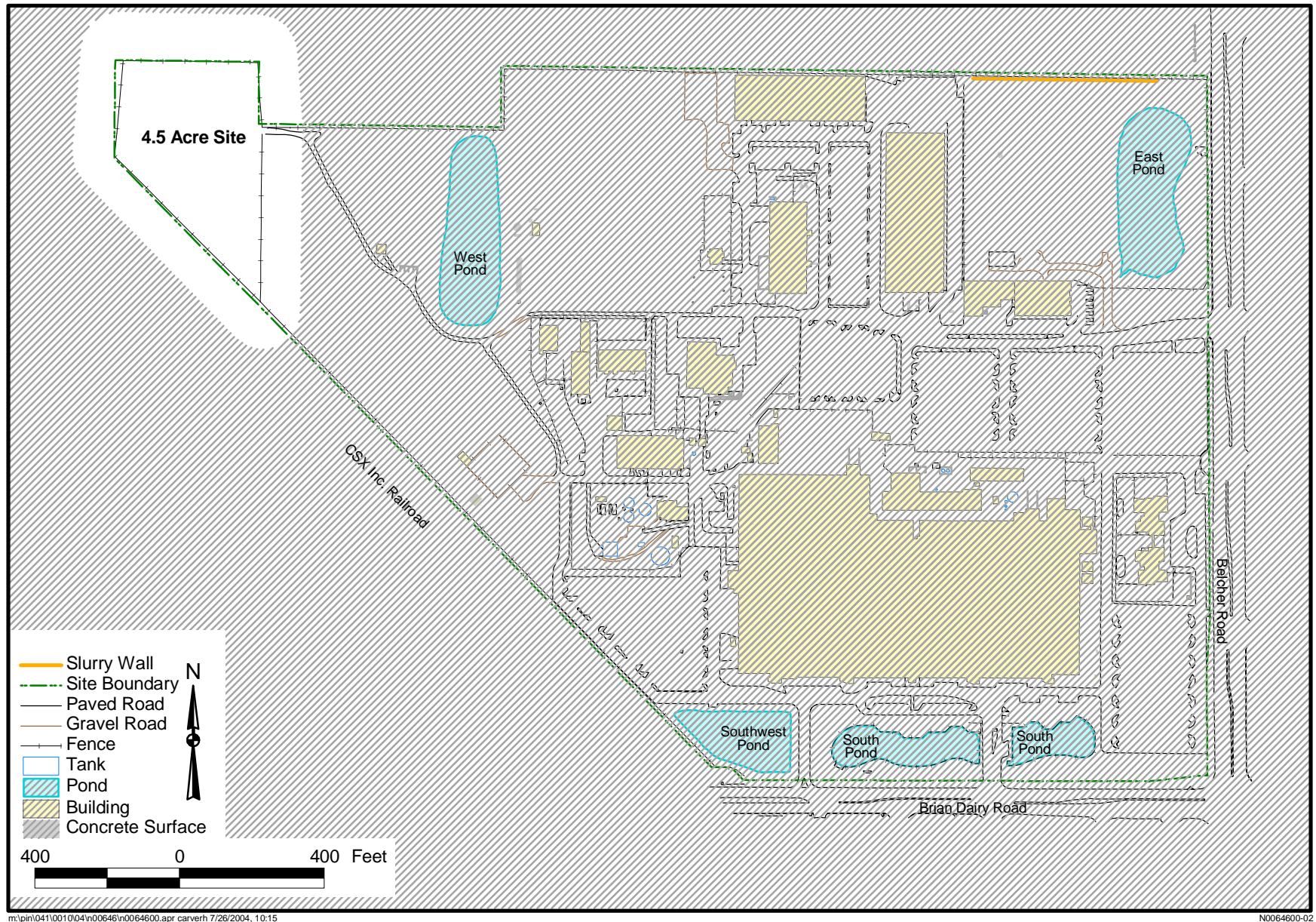


Figure 2. 4.5 Acre Site Location

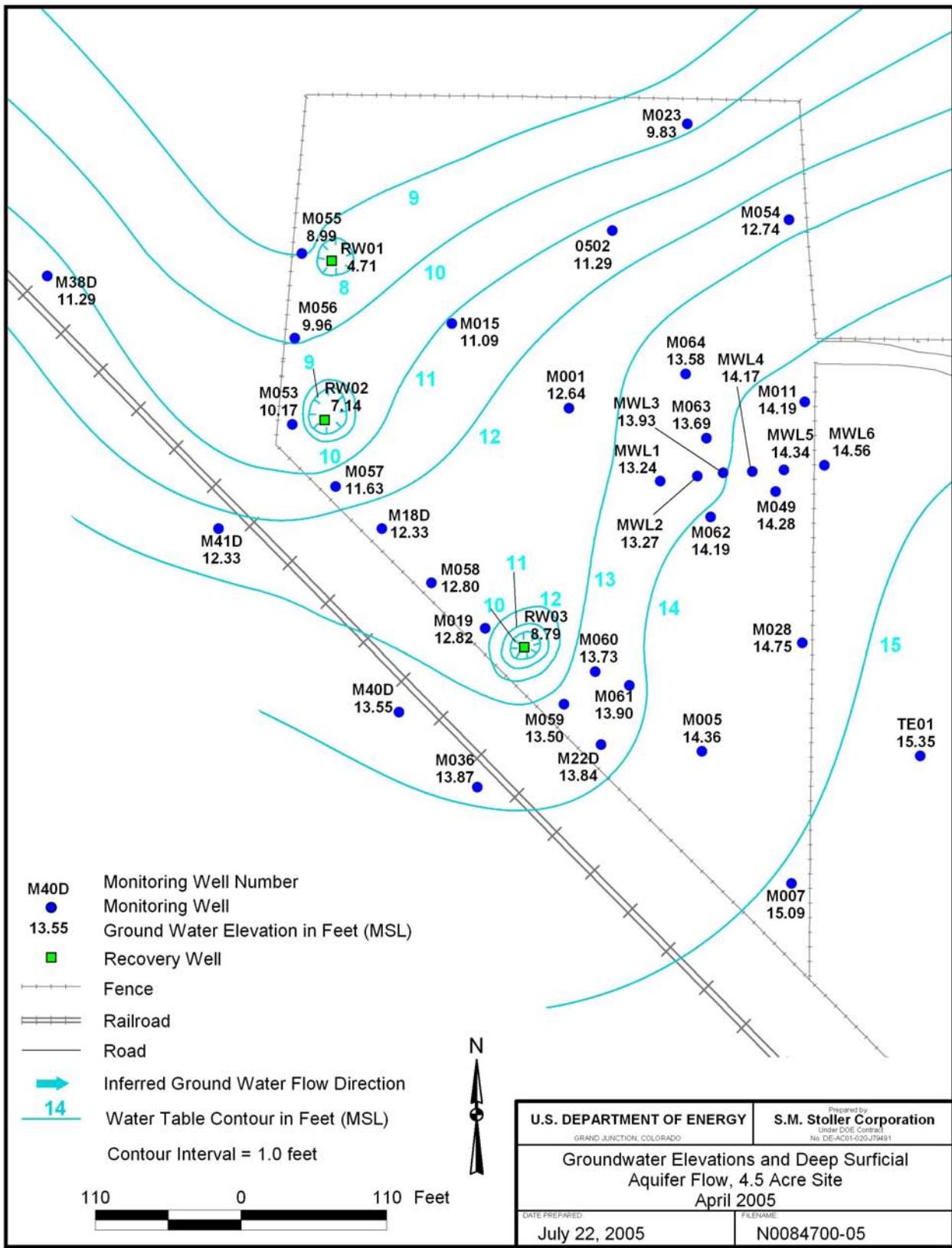


Figure 3. Ground Water Elevations and Deep Surficial Aquifer Flow, 4.5 Acre Site, April 2005

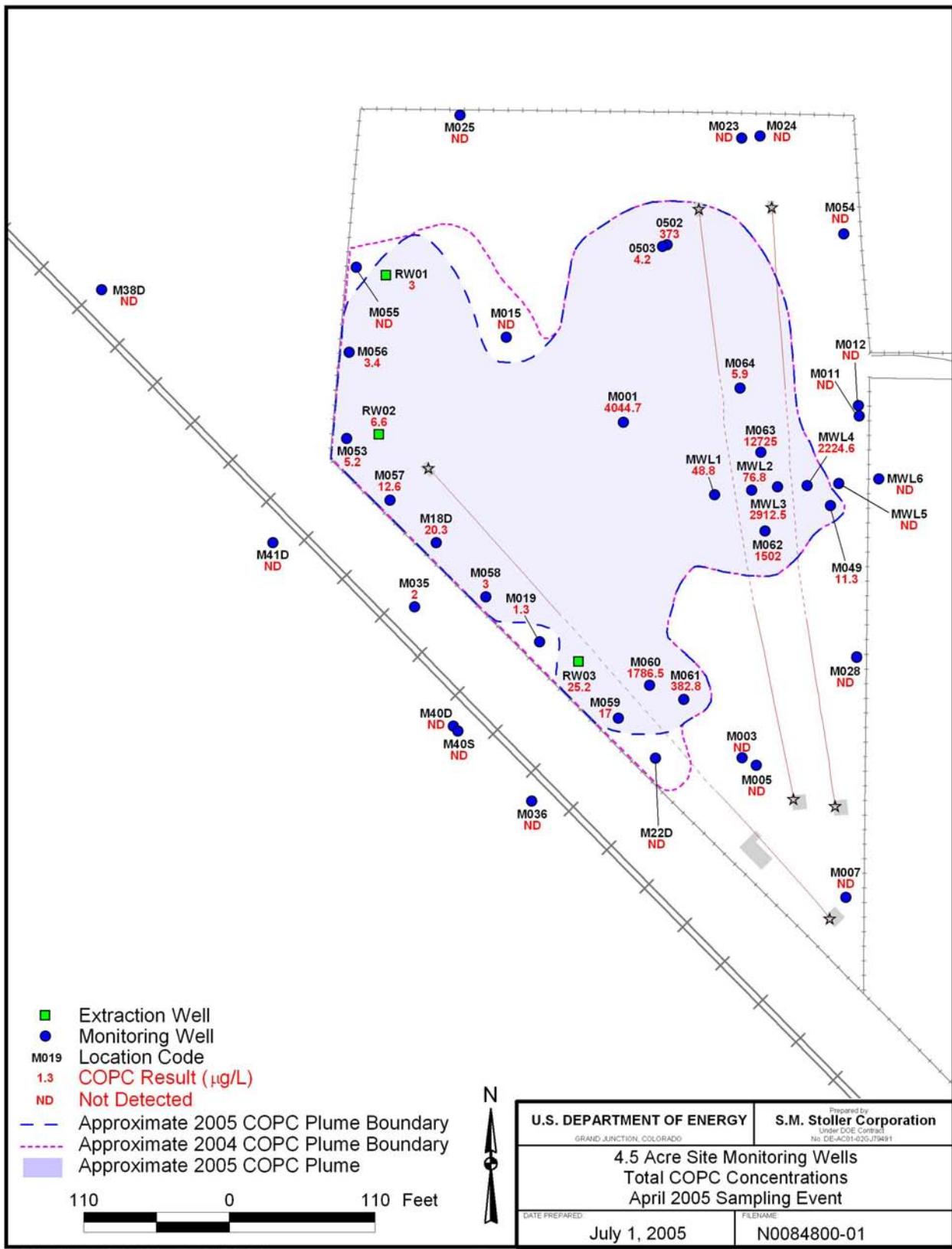
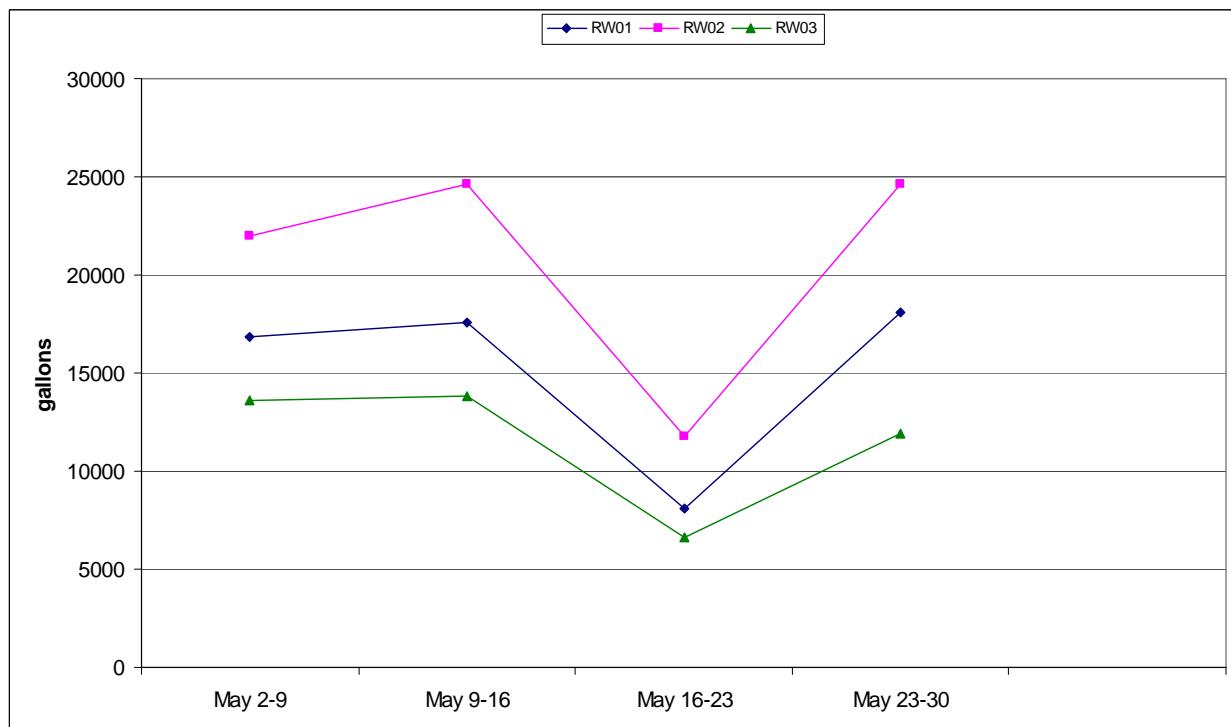


Figure 4. 4.5 Acre Site TCOPC Concentrations April 2005 Sampling Event



*Figure 5. April 2005 4.5 Acre Site Ground Water Recovery*



*Figure 6. May 2005 4.5 Acre Site Ground Water Recovery*

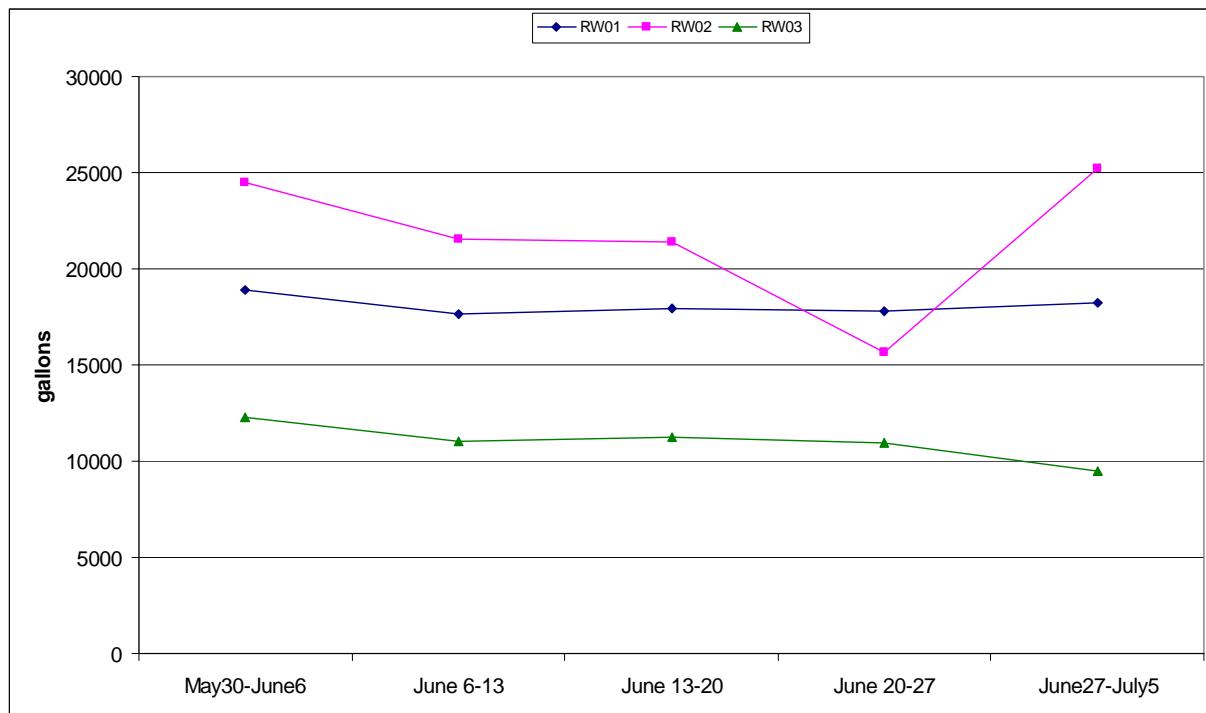


Figure 7. June 2005 4.5 Acre Site Ground Water Recovery

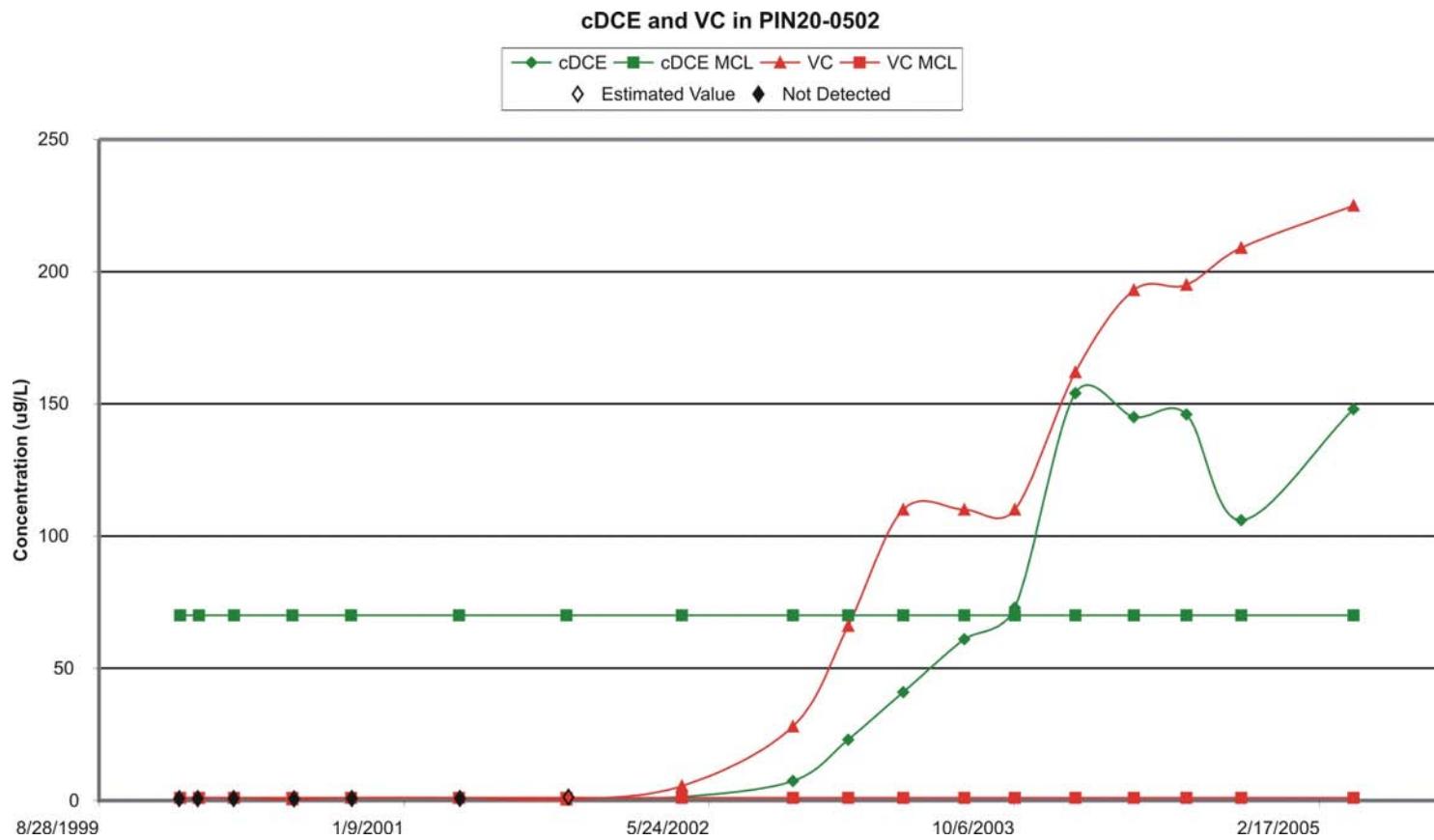


Figure 8. *cis*-1,2-DCE and VC Trends in PIN20-0502

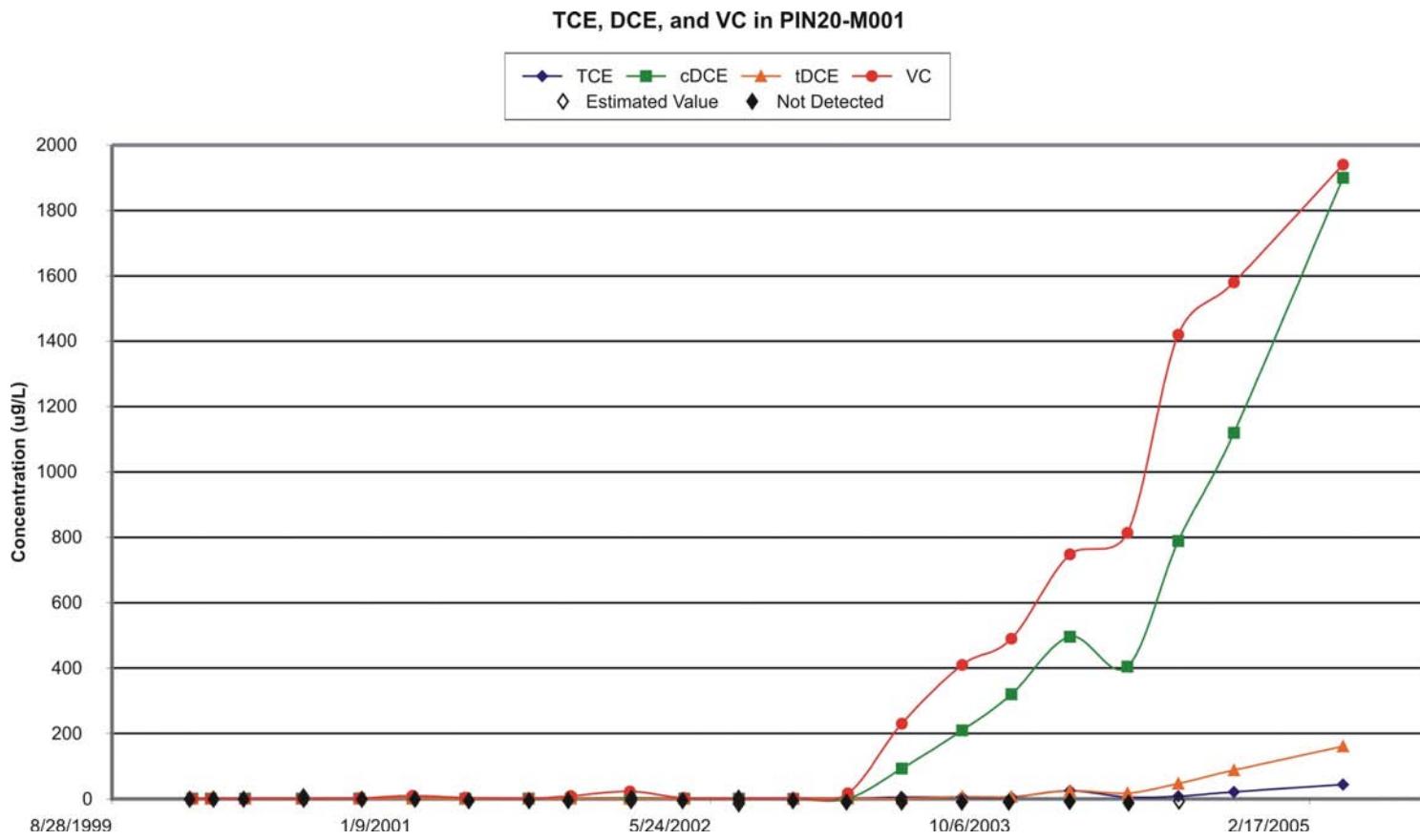


Figure 9. *cis*- and *trans*-1,2-DCE and VC Trends in PIN20-M001

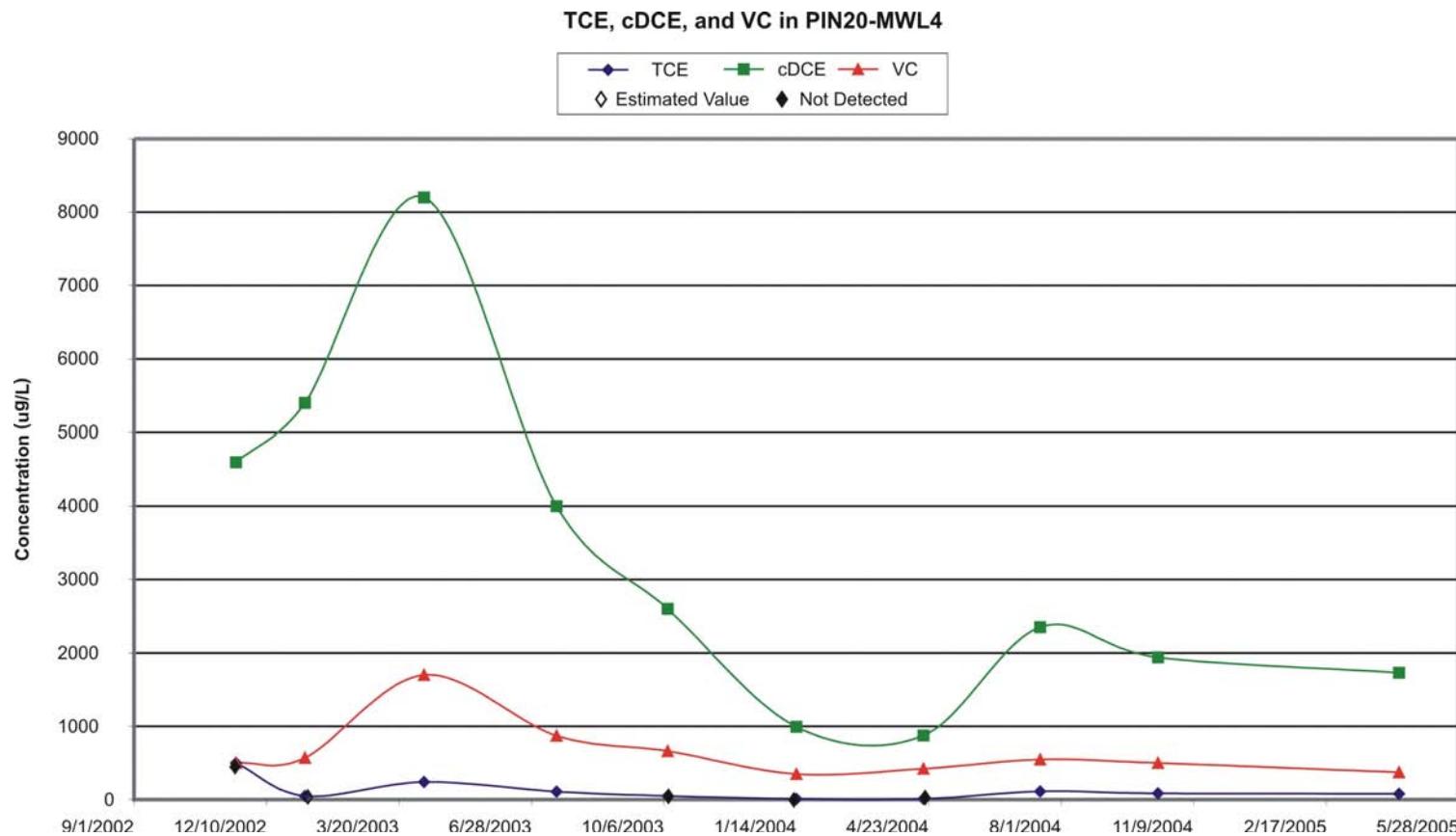
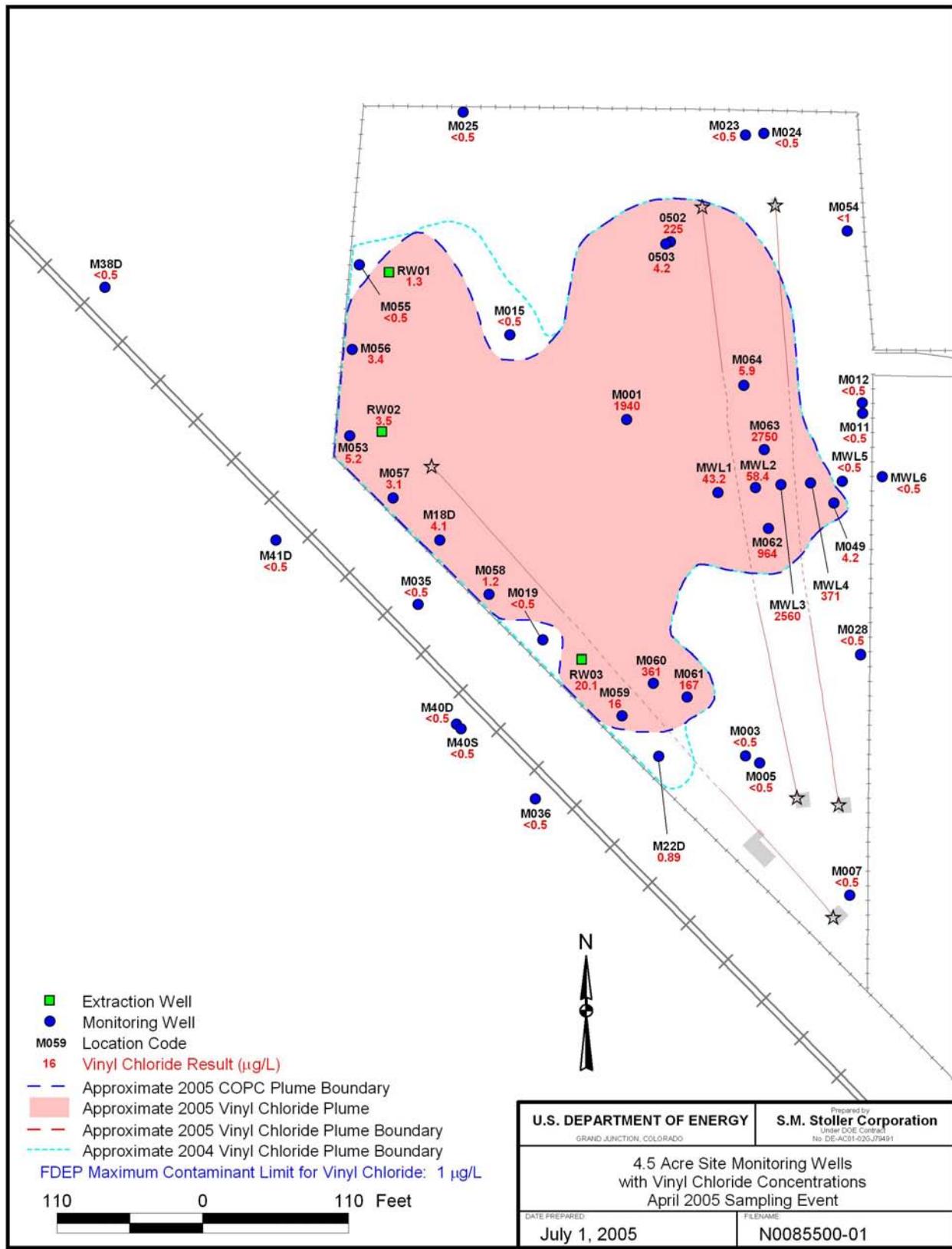


Figure 10. TCE, cis-1,2-DCE and VC Trends in PIN20-MWL4



*Figure 11. VC Plume Map*

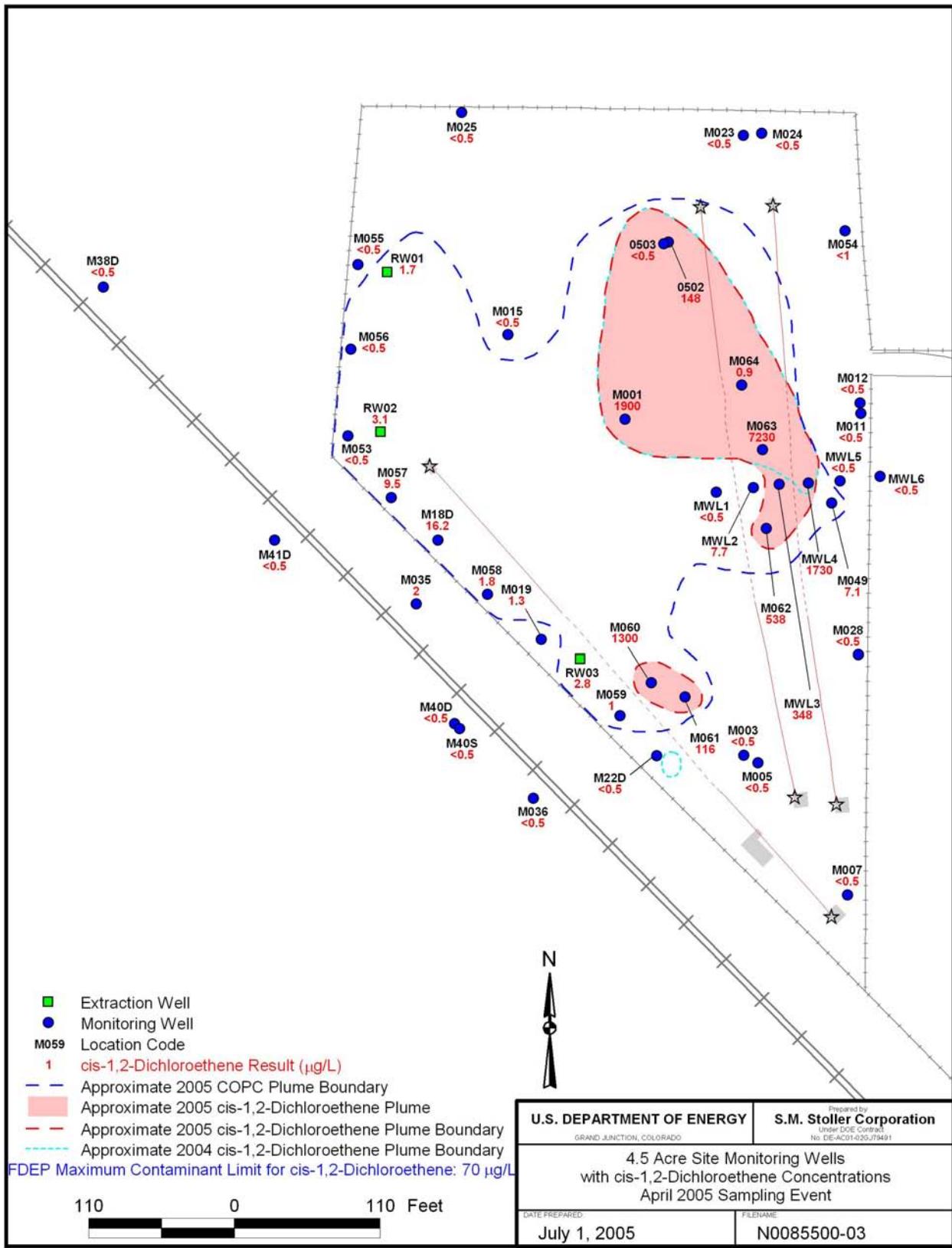
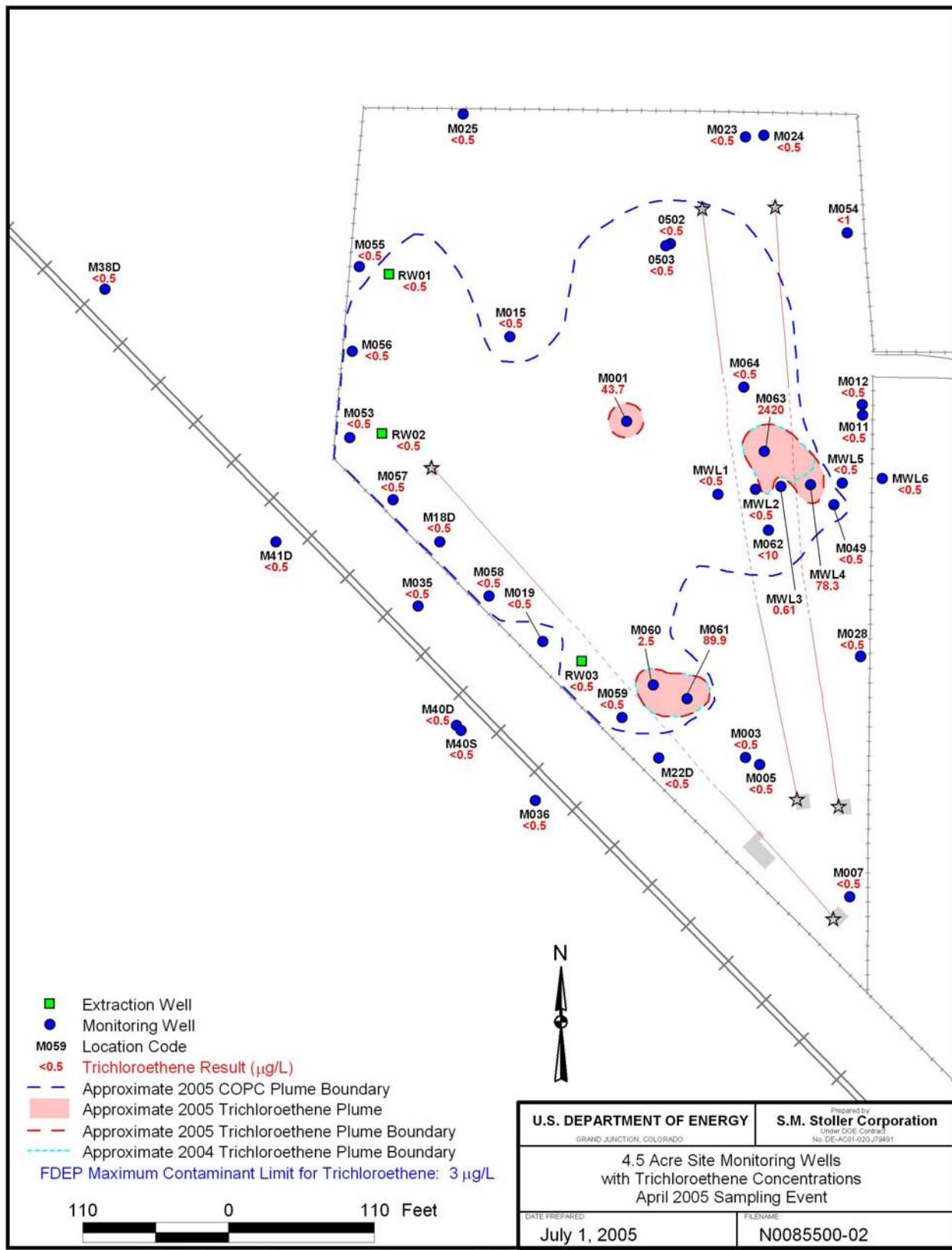


Figure 12. cis-1,2-DCE Plume Map



*Figure 13. TCE Plume Map*

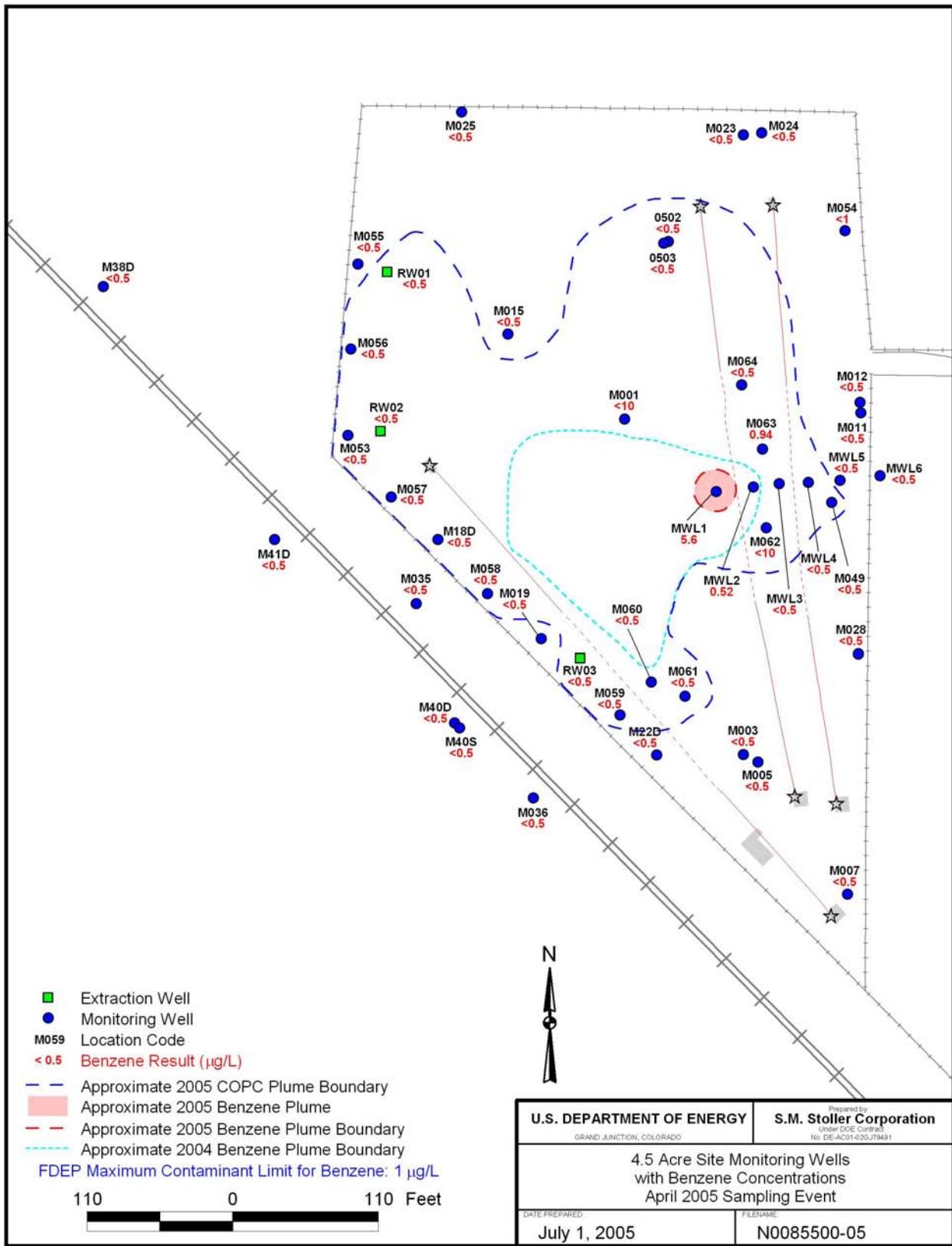


Figure 14. Benzene Plume Map

*Table 1. Water-Level Data at the 4.5 Acre Site*

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
PIN02	<b>West Pond</b>			
W004	4/5/2005	07:50		16.32
PIN05	<b>Trench Site</b>			
0500	4/5/2005	09:42	2.71	15.79
PIN20	<b>4.5 Acre Site</b>			
0502	4/5/2005	08:58	6.11	11.29
0503	4/5/2005	09:00	6.1	11.3
M001	4/5/2005	08:55	4.96	12.64
M003	4/5/2005	08:13	3.69	14.51
M005	4/5/2005	08:16	3.94	14.36
M007	4/5/2005	08:18	4.36	15.09
M011	4/5/2005	09:30	3.91	14.19
M012	4/5/2005	09:32	3.6	14.4
M015	4/5/2005	09:21	6.41	11.09
M019	4/5/2005	08:04	5.18	12.82
M023	4/5/2005	09:11	9.64	9.83
M024	4/5/2005	09:09	6.76	11.04
M025	4/5/2005	09:15	6.55	9.75
M028	4/5/2005	08:20	3.45	14.75
M035	4/5/2005	07:49	6.07	12.73
M036	4/5/2005	07:44	5.43	13.87
M049	4/5/2005	08:24	3.52	14.28
M053	4/5/2005	07:56	7.03	10.17
M054	4/5/2005	09:04	4.96	12.74
M055	4/5/2005	09:19	8.41	8.99
M056	4/5/2005	09:54	7.14	9.96
M057	4/5/2005	07:59	6.27	11.63
M058	4/5/2005	08:02	4.9	12.8
M059	4/5/2005	08:06	4.3	13.5
M060	4/5/2005	08:08	3.6	13.73
M061	4/5/2005	15:03	3.38	13.9
M062	4/5/2005	08:44	3.64	14.19
M063	4/5/2005	08:47	4.41	13.69
M064	4/5/2005	08:51	4.13	13.58
M18D	4/5/2005	08:00	5.37	12.33
M22D	4/5/2005	08:11	3.96	13.84
M38D	4/5/2005	07:30	7.21	11.29
M40D	4/5/2005	07:41	5.85	13.55
M40S	4/5/2005	07:39	5.23	13.97
M41D	4/5/2005	07:35	6.77	12.33
MWL1	4/5/2005	08:45	5	13.24
MWL2	4/5/2005	08:41	4.5	13.27
MWL3	4/5/2005	08:39	3.77	13.93
MWL4	4/5/2005	08:37	3.57	14.17
MWL5	4/5/2005	08:29	4.23	14.34

*Table 1 (continued). Water-Level Data at the 4.5 Acre Site*

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
MWL6	4/5/2005	09:36	3.89	14.56
RW01	4/5/2005	14:56	12.89	4.71
RW02	4/5/2005	14:58	9.96	7.14
RW03	4/5/2005	15:00	8.81	8.79
TE01	4/5/2005	09:52	2.75	15.35

*Table 2. Field Measurements of Samples Collected at the 4.5 Acre Site*

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (μmhos/cm) <sup>a</sup>	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
<b>PIN20</b>	<b>4.5 Acre Site</b>						
0502	21.2–31.2	24.57	1,431	3.94	6.71	-74	0.57
0503	13.2–23.2	24.39	1,586	16.8	6.63	--	0.15
M001	20–25	24.07	1,336	8.77	6.6	-94.2	0.84
M003	9–14	22.83	975	1.59	6.51	35.4	0.33
M005	25.8–30.7	24.07	1,172	4.9	6.71	-40.4	0.15
M007	25.3–30.3	24.32	859	1.59	6.83	-92.8	1.01
M011	23.7–28.7	23.85	915	4.92	6.61	-81.2	0.26
M012	8.6–13.6	22.33	775	13.9	6.51	-5	0.27
M015	20.8–25.8	23.56	731	5.56	6.77	-101.5	0.47
M019	22–27	22.96	1,474	6.09	6.76	-84.2	0.38
M023	19.8–24.8	24.03	809	13	6.78	--	0.22
M024	8.7–13.7	22.95	778	8.44	6.68	--	0.56
M025	8.6–13.6	22.98	1,723	10.2	6.59	--	0.55
M028	22–27	23.52	882	12.4	6.74	98.1	0.57
M035	9–14	22.72	1,370	19.7	6.8	-72.7	0.99
M036	25–30	23.36	880	0.91	6.69	--	0.19
M049	20–30	23.55	1,142	19.8	6.59	-85	0.21
M053	20–30	23.89	1,066	11.6	6.87	-113	0.42
M054	20–30	23.26	1,182	65.1	6.68	--	0.2
M055	21–31	24.72	1,172	19.5	6.72	--	0.11
M056	19–29	24.52	1,107	9.79	6.7	-93.9	0.16
M057	20–30	23.84	1,028	19.3	6.71	-98.1	0.22
M058	18–28	24.25	1,171	19.5	6.72	-92.1	0.2
M059	19–29	23.68	1,080	38.6	6.72	-98.1	0.21
M060	18–28	23.49	955	195	6.84	-111.5	0.3
M061	20–30	24.18	850	753	6.84	-117.3	0.24
M062	20–30	22.88	2,403	174	6.49	-90.5	0.14
M063	19.5–29.5	24.59	2,196	26.2	6.62	-96.6	0.54
M064	15–25	22.88	2,942	28.1	6.45	-85.9	0.4
M18D	20–30	23.88	1,599	15.5	6.82	-98	0.42
M22D	20–30	23.9	1,949	5.82	6.59	-89.6	0.19
M38D	20–30	23.33	748	3.28	6.99	-93.6	1.15
M40D	18–28	23.18	958	18.9	6.75	--	0.14
M40S	4–14	21.53	391	3.09	6.03	--	1.08
M41D	16–26	23.24	1,744	13.5	6.75	-89.2	0.99
MWL1	21–26	23.03	2,889	11.8	6.02	-57.5	0.22
MWL2	21–26	22.92	2,909	10.7	6.47	-94.9	0.2
MWL3	21–26	22.7	1,927	10.8	6.51	-75.3	0.47
MWL4	20.8–25.8	22.95	924	2.22	6.77	-88	0.32
MWL5	20.8–25.8	23.98	882	2.91	6.61	-79	0.28
MWL6	21.5–26.5	23.49	977	4.72	6.68	-84.4	0.37

<sup>a</sup>Temperature corrected to 25°C

-- Not measured

**Table 3. COPC Concentrations from Wells at the 4.5 Acre Site<sup>a</sup>**  
**(reported in micrograms per liter)**

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE <sup>b</sup>	Vinyl chloride	Benzene	Total COPC <sup>c</sup>
FDEP MCL			3	70	100	63	1	1	
PIN20	4.5 Acre Site								
0502	21.2–31.2	4/19/2004	<2.5	145	<2.5	145	193	<2.5	338
		7/14/2004	<2.5	146	<2.5	146	195	<2.5	341
		10/12/2004	<2.5	106	<2.5	106	209	<2.5	315
		4/14/2005	<0.5	148	<0.5	148	225	<0.5	373
0503	13.2–23.2	4/20/2004	<0.5	<0.5	<0.5	ND	0.55J	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	0.95J	<0.5	ND
		10/12/2004	<0.5	<0.5	<0.5	ND	3.2	<0.5	3.2
		4/6/2005	<0.5	<0.5	<0.5	ND	4.2	<0.5	4.2
M001	20–25	4/19/2004	<5	405	17.4	422.4	814	<5	1,236.4
		7/13/2004	8J	789	47	836	1,420	<5	2,256
		10/14/2004	21.4	1,120	87.7	1,207.7	1,580	<10	2,809.1
		4/14/2005	43.7	1,900	161	2,061	1,940	<10	4,044.7
M003	9–14	4/21/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M005	25.8–30.7	4/21/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M007	25.3–30.3	4/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/15/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/12/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M011	23.7–28.7	4/21/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/8/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M012	8.6–13.6	4/21/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/8/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M015	20.8–25.8	4/21/2004	<0.5	<0.5	<0.5	ND	2.2	<0.5	2.2
		7/13/2004	<0.5	<0.5	<0.5	ND	1.3	<0.5	1.3
		10/15/2004	<0.5	<0.5	<0.5	ND	0.8J	<0.5	ND
		4/11/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M019	22–27	4/21/2004	<0.5	<0.5	<0.5	ND	2.3	<0.5	2.3
		7/15/2004	<0.5	0.74J	<0.5	0.74J	1.9	<0.5	1.9
		10/14/2004	<0.5	1.3	<0.5	1.3	1.4	<0.5	2.7
		1/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/11/2005	<0.5	1.3	<0.5	1.3	<0.5	<0.5	1.3
M023	19.8–24.8	4/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/15/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/12/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND

*Table 3 (continued). COPC Concentrations from Wells at the 4.5 Acre Site  
(reported in micrograms per liter)*

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE <sup>b</sup>	Vinyl chloride	Benzene	Total COPC <sup>c</sup>
FDEP MCL			3	70	100	63	1	1	
M024	8.7–13.7	4/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/15/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/13/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M025	8.6–13.6	4/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/12/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M028	22–27	4/19/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/15/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/13/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M035	9–14	4/16/2004	<0.5	0.61J	<0.5	0.61J	<0.5	<0.5	ND
		7/20/2004	1.5	<0.5	<0.5	ND	<0.5	<0.5	1.5
		10/7/2004	<0.5	1.4	<0.5	1.4	<0.5	<0.5	1.4
		1/12/2005	<0.5	2.9	<0.5	2.9	<0.5	<0.5	2.9
		4/7/2005	<0.5	2	<0.5	2	<0.5	<0.5	2
M036	25–30	4/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/7/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M049	20–30	4/21/2004	<0.5	17.5	1.7	19.2	9.1	<0.5	28.3
		7/21/2004	<0.5	9.6	1.1	10.7	6.3	<0.5	17
		10/14/2004	<0.5	7.7	0.69J	7.7	4.8	<0.5	12.5
		4/8/2005	<0.5	7.1	0.61J	7.1	4.2	<0.5	11.3
M053	20–30	4/20/2004	<0.5	<0.5	<0.5	ND	1.8	<0.5	1.8
		7/14/2004	<0.5	<0.5	<0.5	ND	2.7	<0.5	2.7
		10/14/2004	<0.5	<0.5	<0.5	ND	5.1	<0.5	5.1
		1/12/2005	<0.5	<0.5	<0.5	ND	5	<0.5	5
		4/14/2005	<0.5	<0.5	<0.5	ND	5.2	<0.5	5.2
M054	20–30	4/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/6/2005	<1	<1	<1	ND	<1	<1	ND
M055	21–31	4/21/2004	<0.5	1.5	<0.5	1.5	9.9	<0.5	11.4
		7/16/2004	<0.5	<0.5	<0.5	ND	2.2	<0.5	2.2
		10/13/2004	<0.5	<0.5	<0.5	ND	0.8J	<0.5	ND
		1/12/2005	<0.5	<0.5	<0.5	ND	0.56J	<0.5	ND
		4/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M056	19–29	4/21/2004	<0.5	<0.5	<0.5	ND	9.6	<0.5	9.6
		7/15/2004	<0.5	<0.5	<0.5	ND	5.4	<0.5	5.4
		10/14/2004	<0.5	<0.5	<0.5	ND	5.5	<0.5	5.5
		1/12/2005	<0.5	<0.5	<0.5	ND	3	<0.5	3
		4/7/2005	<0.5	<0.5	<0.5	ND	3.4	<0.5	3.4

*Table 3 (continued). COPC Concentrations from Wells at the 4.5 Acre Site  
(reported in micrograms per liter)*

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE <sup>b</sup>	Vinyl chloride	Benzene	Total COPC <sup>c</sup>
FDEP MCL			3	70	100	63	1	1	
M057	20–30	4/21/2004	<0.5	3.8	<0.5	3.8	3.8	<0.5	7.6
		7/20/2004	<0.5	1.7	<0.5	1.7	4.5	<0.5	6.2
		10/14/2004	<0.5	8.4	<0.5	8.4	4.6	<0.5	13
		1/12/2005	<0.5	11.4	<0.5	11.4	3.5	<0.5	14.9
		4/7/2005	<0.5	9.5	<0.5	9.5	3.1	<0.5	12.6
M058	18–28	4/21/2004	<0.5	5.6	0.69J	5.6	3.7	<0.5	9.3
		7/15/2004	<0.5	2	<0.5	2	1.4	<0.5	3.4
		10/14/2004	<0.5	2.9	<0.5	2.9	2.3	<0.5	5.2
		1/12/2005	<0.5	1.9	<0.5	1.9	1	<0.5	2.9
		4/7/2005	<0.5	1.8	<0.5	1.8	1.2	<0.5	3
M059	19–29	4/21/2004	<0.5	<0.5	<0.5	ND	8.3	<0.5	8.3
		7/14/2004	<0.5	<0.5	<0.5	ND	44.1	<0.5	44.1
		10/14/2004	<0.5	6.1	0.99J	6.1	47.3	<0.5	53.4
		1/12/2005	<0.5	2.8	0.64J	2.8	27.7	<0.5	30.5
		4/7/2005	<0.5	1	<0.5	1	16	<0.5	17
M060	18–28	7/16/2004	7.9	63.5	31.9	95.4	339	<0.5	442.3
		10/13/2004	1.7	76.7	27	103.7	455	<0.5	560.4
		1/13/2005	2.4	977	136	1,113	745	<0.5	1,860.4
		4/14/2005	2.5	1,300	123	1,423	361	<0.5	1,786.5
M061	20–30	7/15/2004	242	353	49.5	402.5	647	<5	1,291.5
		10/13/2004	14.3	37.9	19	56.9	520	<0.5	591.2
		1/13/2005	18.5	28.4	6.7J	28.4	253	<5	299.9
		4/13/2005	89.9	116	9.9	125.9	167	<0.5	382.8
M062	20–30	7/21/2004	<25	1,810	<25	1,810	2,310	<25	4,120
		10/15/2004	<0.5	1,190	9.9	1,199.9	2,310	1.2	3,511.1
		1/13/2005	<0.5	2,840	11.8	2,851.8	4,480	1.5	7,333.3
		4/8/2005	<10	538	<10	538	964	<10	1,502
M063	19.5–29.5	7/19/2004	4,880	12,600	612	13,212	3,580	<100	21,672
		10/13/2004	5,930	8,160	562	8,722	3,100	1.2	17,753.2
		1/13/2005	4,290	9,610	486	10,096	3,450	<50	17,836
		4/13/2005	2,420	7,230	325	7,555	2,750	0.94J	12,725
M064	15–25	7/16/2004	<0.5	10.3	<0.5	10.3	45.2	<0.5	55.5
		10/14/2004	<0.5	1	<0.5	1	9.4	<0.5	10.4
		1/13/2005	<0.5	3.5	<0.5	3.5	14.2	<0.5	17.7
		4/14/2005	<0.5	0.9J	<0.5	0.9J	5.9	<0.5	5.9
M18D	20–30	4/20/2004	<0.5	10.2	<0.5	10.2	5.7	<0.5	15.9
		7/14/2004	<0.5	11.1	<0.5	11.1	5.6	<0.5	16.7
		10/14/2004	<0.5	13.3	<0.5	13.3	6.9	<0.5	20.2
		1/12/2005	<0.5	15	<0.5	15	5.8	<0.5	20.8
		4/13/2005	<0.5	16.2	<0.5	16.2	4.1	<0.5	20.3

*Table 3 (continued). COPC Concentrations from Wells at the 4.5 Acre Site  
(reported in micrograms per liter)*

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE <sup>b</sup>	Vinyl chloride	Benzene	Total COPC <sup>c</sup>
FDEP MCL			3	70	100	63	1	1	
M22D	20–30	4/20/2004	<0.5	<0.5	<0.5	ND	1.9	<0.5	1.9
		7/14/2004	<0.5	<0.5	<0.5	ND	1.6	<0.5	1.6
		10/14/2004	<0.5	<0.5	<0.5	ND	1.4	<0.5	1.4
		1/12/2005	<0.5	<0.5	<0.5	ND	1.3	<0.5	1.3
		4/7/2005	<0.5	<0.5	<0.5	ND	0.89J	<0.5	ND
M38D	20–30	4/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/7/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M40D	18–28	4/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/7/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M40S	4–14	4/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/7/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
M41D	16–26	4/16/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/7/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/7/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
MWL1	21–26	4/21/2004	<0.5	<0.5	<0.5	ND	4	9.2	13.2
		7/21/2004	<0.5	<0.5	<0.5	ND	6.8	3.6	10.4
		10/15/2004	<0.5	<0.5	<0.5	ND	5.4	6.1	11.5
		4/8/2005	<0.5	<0.5	<0.5	ND	43.2	5.6	48.8
MWL2	21–26	4/19/2004	0.91J	16.1	14.7	30.8	99.3	1.6	131.7
		7/21/2004	<1	11.8	17.5	29.3	110	<1	139.3
		10/14/2004	<0.5	23.7	23.8	47.5	124	0.74J	171.5
		4/8/2005	<0.5	7.7	10.7	18.4	58.4	0.52J	76.8
MWL3	21–26	4/19/2004	<0.5	0.54J	<0.5	0.54J	735	<0.5	735
		7/16/2004	<0.5	8.9	<0.5	8.9	2,180	<0.5	2,188.9
		10/13/2004	<0.5	224	1.7	225.7	2,820	<0.5	3,045.7
		4/13/2005	0.61J	348	4.5	352.5	2,560	<0.5	2,912.5
MWL4	20.8–25.8	4/19/2004	<10	873	19.8J	873	422	<10	1,295
		7/16/2004	113	2,350	63.3	2,413.3	546	<0.5	3,072.3
		10/13/2004	84.5	1,940	75.9	2,015.9	498	<0.5	2,598.4
		4/13/2005	78.3	1,730	45.3	1,775.3	371	<0.5	2,224.6
MWL5	20.8–25.8	4/21/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/21/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/14/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/8/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND

*Table 3 (continued). COPC Concentrations from Wells at the 4.5 Acre Site  
(reported in micrograms per liter)*

Location	Screen Depth (ft)	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE <sup>b</sup>	Vinyl chloride	Benzene	Total COPC <sup>c</sup>
FDEP MCL			3	70	100	63	1	1	
MWL6	21.5–26.5	4/22/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		7/20/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		10/15/2004	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
		4/11/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND
RW01	10–30	4/20/2004	<0.5	1.2	<0.5	1.2	7.4	<0.5	8.6
		7/6/2004	<0.5	2.9	<0.5	2.9	4.7	<0.5	7.6
		10/5/2004	<0.5	2	<0.5	2	1.3	<0.5	3.3
		1/6/2005	<0.5	2.1	<0.5	2.1	1.3	<0.5	3.4
		4/6/2005	<0.5	1.7	<0.5	1.7	1.3	<0.5	3
RW02	8–28	4/20/2004	<0.5	<0.5	<0.5	ND	1.2	<0.5	1.2
		7/6/2004	<0.5	1.1	<0.5	1.1	4.6	<0.5	5.7
		10/5/2004	<0.5	2.3	<0.5	2.3	3.2	<0.5	5.5
		1/6/2005	<0.5	3.3	<0.5	3.3	2.6	<0.5	5.9
		4/6/2005	<0.5	3.1	<0.5	3.1	3.5	<0.5	6.6
RW03	8–28	4/20/2004	<0.5	<0.5	<0.5	ND	4.9	<0.5	4.9
		7/6/2004	<0.5	0.57J	1.3	1.3	7.3	<0.5	8.6
		10/5/2004	<0.5	1.8	1.4	3.2	9.5	<0.5	12.7
		1/6/2005	<0.5	2.5	1.9	4.4	9.2	<0.5	13.6
		4/6/2005	<0.5	2.8	2.3	5.1	20.1	<0.5	25.2

<sup>a</sup>Before December 18, 2003, "<" values are reporting limits. On or after December 18, 2003, "<" values are method detection limits.

<sup>b</sup>Total 1,2-DCE is the sum of cis-1,2-DCE and trans-1,2-DCE.

<sup>c</sup>Total COPC is the sum of the individual COPC concentrations. The cis-1,2-DCE and trans-1,2-DCE values are not part of the total COPC value because these values are included in the total 1,2-DCE value. "J" values are not included in the total COPC value.

ND = Not detected.

J = Estimated value, result is between the reporting limit and the method detection limit.

*Table 4. Arsenic Concentrations from Wells at the 4.5 Acre Site*

<b>Location</b>	<b>Sample Date</b>	<b>Concentration (mg/L)</b>
<b>4.5 Acre Site</b>		
0502	4/14/2005	<0.0035
0503	4/6/2005	0.0131
MWL2	4/8/2005	<0.0035
MWL3	4/13/2005	<0.0035
MWL4	4/13/2005	<0.0035
MWL6	4/11/2005	<0.0035

"<" values are method detection limits.

*Table 5. RPD for Duplicate Samples, 4.5 Acre Site*

Sample ID	Duplicate ID	Case Number	Constituent	S <sup>a</sup>	D <sup>b</sup>	RPD Value	5 times DL <sup>c</sup>	Fail <sup>d</sup>
PIN20-M023	PIN20-0553	F30887	nondetect for VOCs					
PIN20-M053	PIN20-0550	F31184	Vinyl chloride	5.2	5.1	1.9	2.5	
PIN20-M055	PIN20-0551	F30966	nondetect for VOCs					
PIN20-MWL2	PIN20-0552	F30974	1,1-Dichloroethene	0.55	0.58	5.3	2.5	
			Benzene	0.52	0.53	1.9	2.5	
			cis-1,2-Dichloroethene	7.7	7.7	0.0	2.5	
			trans-1,2-Dichloroethene	10.7	11.3	5.5	2.5	
			Vinyl chloride	58.4	62.3	6.5	2.5	
			Arsenic	0.00175	0.0035	NA	0.0175	

<sup>a</sup>S = Original sample (N001), VOC concentration in  $\mu\text{g}/\text{L}$ .

<sup>b</sup>D = Duplicate sample (N002), VOC concentration in  $\mu\text{g}/\text{L}$ .

<sup>c</sup>DL = Detection limit.

<sup>d</sup>Fail is an RPD greater than  $\pm 30\%$  and an original or duplicate sample more than 5 times the detection limit.

*Table 6. Summary of Analytical Results for the 4.5 Acre Site Treatment System  
(reported in micrograms per liter unless otherwise noted)<sup>a</sup>*

Location <sup>b</sup>	Date Sampled	TCE	cis-1,2-DCE	trans-1,2-DCE	Total 1,2-DCE <sup>c</sup>	Vinyl chloride	Benzene	Total COPC <sup>d</sup>	CaCO <sub>3</sub> mg/L	Fe mg/L
PIN20 4.5 Acre Site										
TRTI	4/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND	962	6.85
	5/6/2005	<0.5	1.6	<0.5	1.6	<0.5	<0.5	1.6	948	6.88
	6/6/2005	<0.5	2.4	<0.5	2.4	2.8	<0.5	5.2	933	7.19
TRTE	4/6/2005	<0.5	2	<0.5	2	3.5	<0.5	5.5	978	6.76
	5/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND	912	6.61
	6/6/2005	<0.5	<0.5	<0.5	ND	<0.5	<0.5	ND	939	7.32

<sup>a</sup>"<" values are method detection limits.

<sup>b</sup>TRTI is the system influent and TRTE is the system effluent.

<sup>c</sup>Total 1,2-DCE is the sum of cis-1,2-DCE and trans-1,2-DCE.

<sup>d</sup>Total COPC is the sum of the individual COPC concentrations. The cis-1,2-DCE and trans-1,2-DCE values are not part of the total COPC value because this value is included in the total 1,2-DCE value. "J" values are not included in the total COPC value.

J = Estimated value, result is between the reporting limit and the method detection limit.

ND = Not detected.

*Table 7. Estimated Mass of VOCs Recovered from the 4.5 Acre Site Recovery Wells  
During April, May, and June 2005*

Month	Volume Treated (gallons)	Concentration <sup>a</sup>						
		cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	Toluene (µg/L)	TCE (µg/L)	Methylene Chloride (µg/L)	Vinyl Chloride (µg/L)	
April 2005	187,975	0.25	0.25	0.25	0.25	0.5	0.25	1.75
May 2005	211,919	1.6	0.25	0.25	0.25	0.5	0.25	3.1
June 2005	208,296	2.4	0.25	0.25	0.25	0.5	2.8	6.45

Month	Volume Treated (gallons)	Mass Recovered <sup>b</sup>						
		cis-1,2-DCE (lbs)	trans-1,2-DCE (lbs)	Toluene (lbs)	TCE (lbs)	Methylene Chloride (lbs)	Vinyl Chloride (lbs)	
April 2005	187,975	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May 2005	211,919	0.00	0.00	0.00	0.00	0.00	0.00	0.01
June 2005	208,296	0.00	0.00	0.00	0.00	0.00	0.00	0.01

<sup>a</sup>These concentrations represent the average of monthly sampling results.

<sup>b</sup>Includes "J" (estimated) values. For any detection of "<", which indicates the laboratory could not detect that analyte, 50 percent of the "<" value was used for the calculation of recovery.

*Table 8. Dissolved Gas for the 4.5 Acre Site*

<b>Location</b>	<b>Date Sampled</b>	<b>Ethane µg/L</b>	<b>Ethene µg/L</b>	<b>Hydrogen nmol/L</b>	<b>Methane µg/L</b>	<b>Carbon dioxide mg/L</b>
PIN20	0502	26	3	0.68	1,100	82
	M001	66	45	0.93	1,200	88
	M007	<0.005	<0.005	2.6	2,800	65
	M028	<0.005	<0.005	0.67	1,700	73
	M053	<0.005	0.031	0.88	1,500	55
	M060	14	17	1	1,500	40
	M061	0.015	9.6	1.8	1,500	44
	M063	67	97	0.86	730	90
	M064	1.5	0.13	0.86	360	100
	M18D	0.011	0.049	1.2	410	30
	MWL3	19	77	0.72	180	110
	MWL4	0.068	12	0.9	350	72

"<"=not detected above the associated value.



## **Appendix B**

### **Laboratory Reports for 4.5 Acre Site Treatment System— April through June 2005**

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